

## ABSTRACT

The present invention is directed to an analog, oligomer-based method for determining a mathematical result of carrying out an operation of matrix algebra on input data. The method comprises representing at least one m-component vector  $V = \sum_i V_i e_i$  by a set of single-stranded oligomers  $E_i$  and  $\underline{E}_i$  which are in 1:1 correspondence with the basis vectors  $e_i$ ,  $i = 1, 2, \dots, m$  in an abstract m-dimensional vector space. A composition comprising at least one set of oligomers  $E_i$  and  $\underline{E}_i$  representing the components of a vector is obtained as input data and is subjected to at least one physical or chemical treatment having an effect on the oligomers that is an analog representation of an operation of matrix algebra. The method can be used to represent the operations of a neural network; for example, to produce a content-addressable memory, or a multilayer perceptron.